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ABSTRACT

This study investigated infant crying as a form of communication, with fear considered only one of many possible motivating emotions. Crying, along with fretting and withdrawal, are the major ways infants have to indicate that they desire to change the present situation. Subjects were 91 white, middle class infants whose mothers wete their primary caregivers. Infants were tested within one week of their 6-, or 12-month birthdays. The Stranger and Mother Test was administered first, followed immediately by the Persistence Test. Next, a brief Stranger Test was administered. An observer, seated behind a one-way mirror, rated each infant's positive and negative responses, using a 7- point affect scale, ranging from laughing to crying. Data were analyzed by t-tests and product moment correlations. Results show that the emotions underlying infant crying are manifold, and cannot be explained entirely in terms of "stranger fear." (Author/CS)

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Function of Infant Crying in Stranger Situations

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Negative reactions have been emphasized in most studies of infants' reactions to strangers. The resulting impression is that negative reactions are a nearly universal phenomenon, that they are necessary for normal development, and that their emergence is a significant developmental event (see review by Rheingold and Eckerman, in press). This emphasis has recently been challenged by Rheingold and Eckerman (in press). They did not observe negative stranger reactions in their studies, and have questioned the existence of infant stranger fears during the second half year of life. Unlike these authors, we witnessed considerable infant distress during infant-stranger interactions.

The main thesis of this paper is that infant crying should be considered a form of communication, with fear but one of many possible motivating emotions. Crying, along with fretting and withdrawal, are the major ways infants have to indicate that they desire to change the present situation. Infants do cry, sometimes, in the presence of strangers, but their crying should not automatically be considered a sign of fear.

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In our study, both an unfamiliar female experimenter and the mother approached the infant in a gradually intensified sequence of events. Then, in a second test, the experimenter offered the infant a series of toys to play with for about ½ hour. Finally, in a third test, the now more familiar experimenter repeated a few of the more intense steps from the first sequence.

The repetition of some events by both the mother and the experimenter permit an evaluation of the meaning of infants' affective responses. If infant crying indicates fear, crying would be expected in experimenter-infant interactions but not in mother-infant interactions. Infants would be expected to react more negatively when the experimenter held them than when she later put them down into a feeding table, and more negatively to a completely unfamiliar than a somewhat familiar experimenter.

On the other hand, if infant crying is a communication of desire for change in the present situation, infants could cry in both experimenter-infant and mother-infant interactions if they did not like what was happening.

The data analyzed for this study were part of a collaborative research project which developed tests of socio-emotional behaviors in early childhood (Office of Child Development Grant #OCD-CB-268). Because the collaborative research project was ultimately concerned with group differences between home and [illegible] care reared children, the sequence of events was not counterbalanced. The tests measured infants' reactions to strangers and their persistence with objects. Six and twelve month old infants were studied.

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Subjects

Subjects were 91 white, middle class infants whose mothers were their primary caregivers. Approximately half were first born, and approximately equal numbers of boys and girls were tested at each age. The primary sample, tested in Bethesda, Maryland, consisted of 32 six-month and 35 twelve-month-old infants. The replication sample, tested in Gainesville, Florida, consisted of 12 six-month and 12 twelve-month-old infants.

Procedure

The procedure for testing infants was as follows: Infants were tested within one week of their sixth or twelfth month birthdays. Each infant was seen in an observation room with his mother for a single session lasting about 45 minutes. The Stranger + Mother Test was administered first, and was immediately followed by the Persistence Test. The second, brief Stranger Test was then administered. Each infant was tested by one of ten unfamiliar, white female adults.

The sequence of test events is listed on Figure 1. The Stranger and Mother Test was designed to assess infant reactions to the experimenter and the mother when they approached him, when they provided different amounts of physical contact and physical stimulation, when they offered him a toy, and to maternal separation. The total time for the Stranger and Mother Test was about 8 minutes.

The Persistence Test was then administered. The infant was seated on his mother's lap in front of a table. The experimenter offered him a series of objects, one at a time, to play with or look at. The

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experimenter did not interact with the infant, except when offering him a new toy and during a book-reading task. The Persistence Test lasted about 25 minutes.

The Second Stranger Test included only the following sequence of events: the now/more familiar experimenter approached the infant and patted his hand, picked him up, and wiggled him in the air.

Scoring

An observer, seated behind a one-way mirror, made ratings of the infant's positive and negative affect once during each event during the Stranger and Mother Test and the Second Stranger Test. During the Persistence Test, an affect rating was made every 30"; later a single average affect score was derived for each persistence task. A seven point affect scale, ranging from laughing to crying was used. The scale is presented in Figure 1.

Reliability

Product moment correlations for affect ratings between raters in Maryland ranged from .85 to 1.00, with a median and modal coefficient of 1.00. Correlations for affect ratings, made from ratings of video taped sessions, between Maryland and Florida raters ranged from .60 to 1.00, with a median coefficient of .91, and a modal coefficient of 1.00.

Results

Data were analyzed by t-tests and product moment correlations. For an overall picture of the results, refer to Figure 1. This figure illustrates the mean affect scores for each event in the Stranger and

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Mother Test and the Second Stranger Test, and for the two persistence tasks that were the same for the six and twelve month old infants. Only the Maryland infants are represented on the graph.

Briefly, infants responded positively to the experimenter when she talked and smiled but did not touch them, and when she read to them. They responded comparatively less positively when she held them and during the second persistence task. Infants responded positively to being held by their mother and negatively to maternal separation.

If infant crying were just motivated by fear, more crying would be expected in experimenter-infant than mother-infant interactions. Six events were performed by both the mother and the experimenter. Table 1 presents the results of t-tests on these situations for each age group. Infants were more positive to the experimenter than to the mother during distant interactions and hand patting. In contrast, they were more negative to the experimenter than the mother when they were picked up and wiggled in the air. While there were no significant differences in affective responses when offered a toy, infants accepted it more readily when offered by the mother. Thus infants did not consistently show more negative affect toward the experimenter: they were sometimes more positive and sometimes more negative.

Undoubtedly, part of the differences in infant responses to the experimenter and the mother can be accounted for by the difference in the infant's emotional state at the start of the experimenter-infant and mother-infant interaction. Fear might motivate crying during both interaction sequences. Yet it seems more plausible that different

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infant messages were being comunicated. For example, "Put me down!" to the experimenter, and "Pick me up!" to the mother.

If infants feared the experimenter, they should have responded more positively when she put them in the feeding table than when she held them. However, there was no difference in infants' affective responses to the experimenter during the two events. In contrast, infants became significantly more negative when their mother put them in the feeding table, indicating they disliked the separation.

One might expect infants to be more accepting of a somewhat familiar than a completely unfamiliar experimenter: after ½ hour of benign contact, some of their anxiety could dissipate. Table 2 presents t-tests and correlations between events where the experimenter had close physical contact with the infants. Infants responded as negatively or more negatively at the <u>end</u> of the session than they did at the start of the session.

Infants, however, were not consistently negative when they were in close proximity to the strang . There were no significant relationships between infants' affective responses during either the Stranger and Mother Test or the Second Stranger Test and how they reacted during the Persistence Test. That is, infants who enjoyed being held and infants who cried were equally likely to smile and reach for toys during the Persistence Test. In contrast, some consistency was found in infants' responses to the experimenter, when being held and being wiggled in the air, at the beginning and end of the session. Infants,

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them, seemed to accept or protest the experimenter on the basis of what she was doing. It was not her presence per se that influenced their reactions.

Earlier it was proposed that if infant crying in stranger tests were fear, it was reasonable to expect that: the experimenter would elicit negative reactions, that only positive reactions would be elicited by the mother when she engaged in a similar sequence of behaviors, that infants would become more positive when the experimenter put them down, and that fewer negative reactions would be elicited by the experimenter after the infant had become more acquainted with her. Instead, both the experimenter and the mother elicited positive and negative reactions, infants did not become more positive when the experimenter put them down, and infants responded as negatively or more negatively to the experimenter after she was more familiar to them. In addition, infants' pleasure or distress during the Persistence Test was completely unpredictive of their response during the Second Stranger Test. Thus crying was not simply elicited by close proximity to the experimenter. Crying seemed to function as a communication to both the experimenter and the mother. This pattern of crying suggested that fear was not the primary determinant of infant crying in our setting.

In the research conducted by Rheingold and her collaborators, infants rarely became distressed during stranger interactions. Comparing her procedures with the ones used here, several methodological differences emerged that may be directly relevant to infants' affective responses:

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(1). Infant Initiative. If infants are allowed to approach and touch the stranger at their own pace, it seems that they are more likely to accept close physical contact with the stranger.

(2). Contingency of Behaviors. If the stranger's and/or mother's behaviors are pre-programmed, rather than responsive to infant behaviors, it seems that infants are more apt to become distressed.

(3). Presence of Toys. Close proximity to the stranger does not seem to be stressful to infants if toys are available and the infant is not prevented from approaching and contacting his mother. Toys seem to distract the infant's attention away from the stranger's presence.

It is appropriate here to point out the limited options young infants have in communicating: they can approach or withdraw and give positive and negative facial and vocal cues. However, their communications can be easily ignored by an adult. If an infant wants to elicit different behaviors from an adult and his communications are ignored, he has little option but to escalate the intensity of his communication. In Rheingold's procedures, infants did not "need" to cry: they were allowed to control the pace and kind of interaction they had with both the stranger and the mother.

Crying can be considered both as a communication and as a manifestation of an emotion. Infants cry for a variety of reasons, for example, when they are hungry, when they are bored, and when they want to be comforted. The specific reason for infant crying is deduced from what must be done to alleviate crying or what produced it.

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In stranger situations, crying has been assumed to result from infant fear of the stranger. The reason is, presumably, that the crying is associated with intimate stranger contact and terminates with the return of the infant to his mother. However, it is not clear to us how infant crying indicating fear of stranger could be distinguished from crying indicating strong infant preference for his mother, or something else. Whatever the underlying emotion, infants in our study did use crying to communicate displeasure. When the behaviors of the experimenter and/or mother changed, and infants were again in an acceptable situation, they stopped crying.

There is an alternative explanation besides infant fear to explain infant reactions to strangers. The stranger can be considered a novel object. Novel objects evoke both positive approach and negative avoidance responses. In our study, infants were both curious and cautious in their interactions with the experimenter. For example, they stared at her, but only let her pat their hand after she made several attempts. In Rheingold's studies, infants approached the experimenter, but did so slowly.

Conclusion

In our opinion, describing an infant's negative reactions to a stranger as "stranger fear" connotes a greater order of magnitude than is warranted. Just as smiling is not considered synonymous with love, crying should not automatically be considered an indication of fear. Crying may also indicate infant preference for his mother or dislike

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on the feeding table. The emotions underlying infant crying are manifold. However, the communicative function of infant crying is clear. When infants cry in the presence of the stranger, they want her to stop and change what she is doing.

Table 1. Maryland Infants Affective Responses to Mother and Experimenter Compared in Stranger and Mother Test.
(1 cry, 4 neutral, 7 laughs)

(F) = Result replicated by Florida data. #

Events Compared	12 months, N 35 $\bar{X}$	S.D.	t	6 months, N 32 $\bar{X}$	S.D.	t
a. Talking+ Distant						
2. E talks	4.71	.96	+4.36** (F)	5.34	1.00	+2.58* (F)
10. M enters	3.03	2.11		4.50	1.80	
b. Touching						
4. E Pats	4.26	.89	+2.29* (F)	4.91	1.00	+1.74 (F)
11. M Pats	3.40	2.14		4.41	1.54	
c. Holding						
5. E Picks Up	2.89	1.45	-5.12** (F)	4.47	1.02	-1.50 (F)
12. M Picks Up	4.51	1.40		4.78	1.34	
d. Wiggling in Air						
6. E Wiggles	3.20	2.10	-5.41** (F)	4.84	1.89	-4.36** (F)
13. M Wiggles	5.06	2.09		6.06	.91	
e. Put into Feeding Table						
8. E Puts	2.76	1.60	+1.42	3.81	1.75	-2.55*
14. M Puts	2.35	1.87		4.78	1.45	
f. Offering Toy						
9. E Offers	2.77	1.72	-1.61 (F)	3.77	1.45	-1.79 (F)
15. M Offers	3.09	1.98		4.32	.60	
-Toy Acceptance (0 refuses toy; 3 immediately takes toy)						
9. E Offers	1.37	1.48	-3.61** (F)	1.59	1.39	-4.42** (F)
15. M Offers	2.26	1.15		2.69	.59	
Comparisons of Holding to Putting into Feeding Table						
a. Experimenter						
7. E Returns	2.89	1.41	+.77 (F)	3.75	1.14	-.25 (F)
8. E Puts	2.71	1.60		3.81	1.75	
b. Mother						
12. M Picks Up	4.56	1.40	+6.54** (F)	4.78	1.34	0 (F)
14. M Puts	2.35	1.87		4.78	1.45	

* $p \leq .05$
** $p \leq .01$

N = 12 at 6 months; N = 12 at 12 months.

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Table 2. Comparison of Maryland Infant's Affective Responses to the Experimenter in the Stranger and Mother Test and Second Stranger Test.

	12 months, N = 35ø				6 months, N = 30ø			
Events Compared	$\bar{X}$	S.D.	t	r	$\bar{X}$	S.D.	t	r
a. Touching								
4. E Pats	4.26	.89	+.53	.14 (F)	4.93	1.02	+1.54	.36
19. E PATS	4.11	1.45			4.60	1.07		
b Holding								
E. E Picks Up	2.89	1.45	+3.89**	.55**	4.50	1.04	+.24	.37
20. E Picks Up	2.00	1.39			4.43	1.55		
c. Wiggling in Air								
6.2 Wiggles in Air	3.20	2.10	+2.24*	.60**(F)	4.77	1.92	+.33	.85*
21. E Wiggles in Air	2.51	1.96			4.70	2.05		

* $p \leq .05$
** $p \leq .01$

ø Replication data reported for 12 month Florida sample only. (N = 3 at 6 months, N = 12 at 12 months).

(F) = Result replicated by Florida data.

Figure 1. Mean Affect Responses of 6 and 12 month old Maryland Infants.

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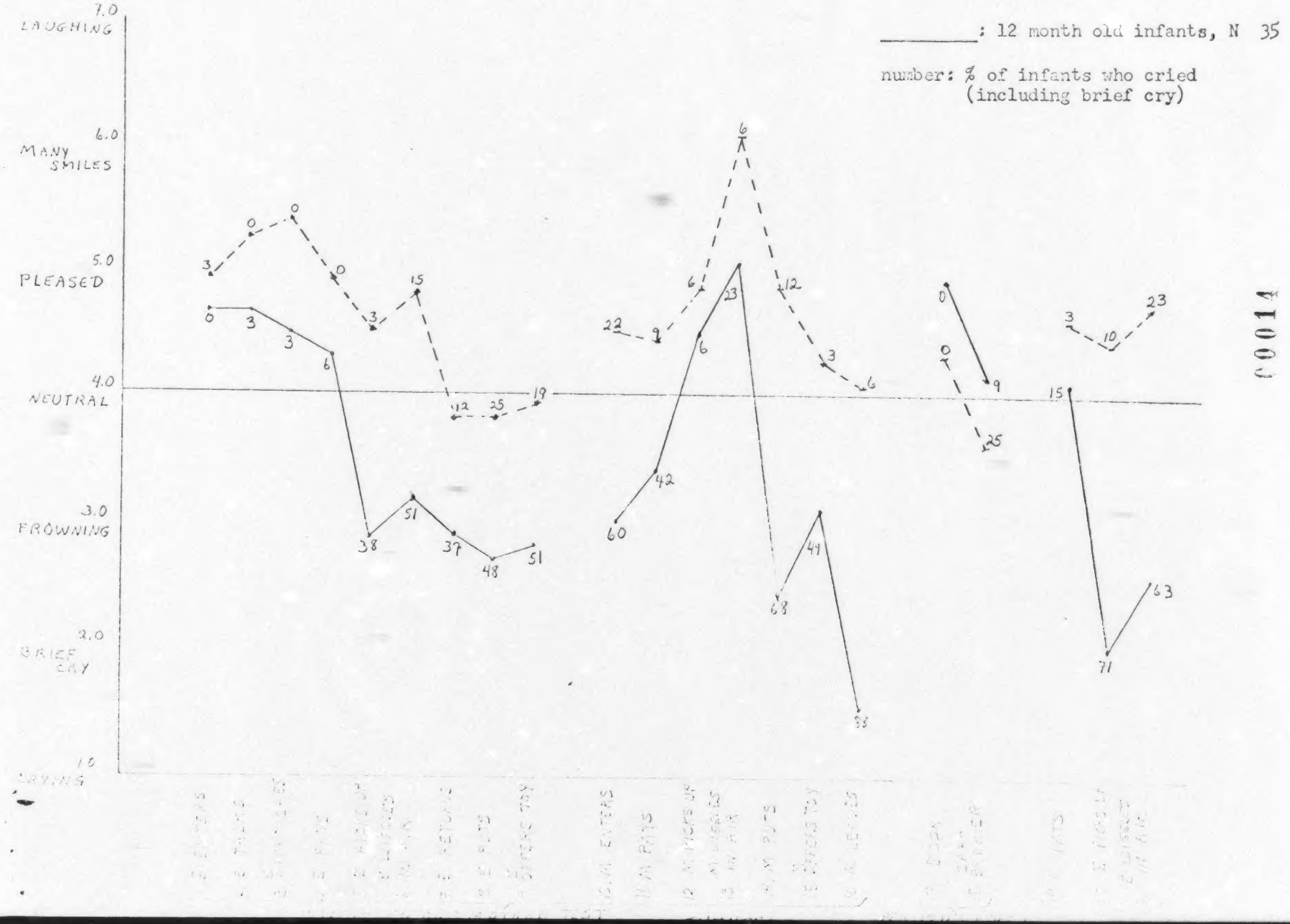
- - - - - -: 6 month old infants, N 32
_____: 12 month old infants, N 35
number: % of infants who cried (including brief cry)
7.0 LAUGHING
6.0 MANY SMILES
5.0 PLEASED
4.0 NEUTRAL
3.0 FROWNING
2.0 BRIEF CRY
1.0 CRYING
- MEAN AFFECT -
0 3 0 0 3 15 12 25 19
3 0 0 0 3 6 38 51 37 48 51
22 9 6 23 6 12 3 6
0 0 9 25 15
3 10 23 71 63
60 42 68 49 33
00014